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Can we reduce the burden of the current UK guidelines for Retinopathy of Prematurity (ROP) screening?

Authors

Gillian Adams[1] MD FRCS

Cathy Williams[2]

Neena Modi[3]

Wen Xing[4]

Catey Bunce[5] DSc

UK Retinopathy of Prematurity Special Interest Group[6]

Annegret Dahlmann-Noor[1,4] MD PhD

Authors' addresses:

1. Paediatric and Strabismus Service, Moorfields Eye Hospital NHS Foundation Trust, 162 City Road, London EC1V 2PD, United Kingdom

2. School of Social and Community Medicine, University of Bristol, Office Room BG2, Oakfield House, Oakfield Grove, Clifton BS8 2BN, cathy.williams@bristol.ac.uk

3. Section of Neonatal Medicine, Department of Medicine, Imperial College London, London SW10 9NH, United Kingdom n.modi@imperial.ac.uk

4. National Institute of Health Research Biomedical Research Centre for Ophthalmology, University College London Institute of Ophthalmology and Moorfields Eye Hospital, 162 City Road, London EC1V 2PD, United Kingdom

5. Department of Primary Care & Public Health Sciences, King's College London, 4th Floor, Addison House, Guy's Campus, London, SE1 1UL, catey.bunce@kcl.ac.uk

6. Members of the UK Retinopathy of Prematurity Special Interest Group are listed before the references

Corresponding author:

Annegret Dahlmann-Noor

NIHR Biomedical Research Centre at Moorfields Eye Hospital and UCL Institute of Ophthalmology

162 City Road, London EC1V 2PD, UK

annegret.dahlmann-noor@moorfields.nhs.uk

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Infants born more than 8-10 weeks preterm are at risk of developing sight-threatening retinopathy of prematurity (ROP). In the UK and other countries, paediatric ophthalmologists systematically screen infants at risk, with the aim of identifying ROP requiring treatment to prevent adverse structural outcomes such as retinal detachment and macular dragging, and poor functional outcomes such as sight impairment.

ROP screening involves instillation of mydriatics, application of a lid speculum, and fundoscopy via indirect ophthalmoscopy or digital imaging, and is distressing for infants. Changes in blood pressure, respiratory rate, oxygen saturation and pulse rate and facial changes indicative of pain are common. [1] [2] [3] Repeated screening is required at weekly or two-weekly intervals either until ROP has spontaneously regressed, or a need for treatment has been established.

ROP screening requires a skilled workforce available 52 weeks a year. Failure to identify infants requiring treatment at the appropriate time, as well as resulting in blindness for the premature infant, can have significant adverse medicolegal considerations. [4] Over recent years, the increasing number of infants surviving preterm birth has resulted in an increased need for trained paediatric ophthalmologists.

There is no universal consensus on the cut-off for gestational age (GA) that should determine the need for screening, and as ROP is a developmental disorder it is illogical for birth weight (BW) to be included in the selection algorithm. The inclusion of BW likely arose before universal assignment of GA through early ultrasound assessment, and remains a historical anachronism. In the US, screening is recommended for GA of 30 weeks or less and BW of 1,500g or less (plus selected infants with a higher GA and BW and an unstable clinical course). [5] In Canada, infants are screened if GA is 30+6/7 or less, regardless of BW, or if BW is 1,250g or less. [6] In Sweden, screening is undertaken for GA of 31 weeks or less, with no consideration of BW. [7]

The current UK guidelines (2008) recommend screening for infants with a GA of less than 32 weeks or BW less than 1,501 g. [8] We recently reported that of 8,112 infants with BW less than 1,500g born over a one-year period in the UK and Northern Ireland, 327 (4%) required ROP treatment. [9] A revision of the UK ROP screening guidelines is now under consideration.

Is it possible to reduce the UK screening burden?

In our recent national study, the median GA of infants requiring ROP treatment was 25 weeks and the median BW 706 g. [9] No baby was over 32 weeks GA and all were 31 weeks GA or less; only one baby had a BW over 1,500 g (BW 2,080g, GA 30+1 weeks, diabetic mother).

Tightening the UK screening criteria to reduce the number of infants screened unnecessarily should ensure that no cases of ROP requiring treatment are missed. Possible scenarios are to 1) keep the current GA indication of 31+6 weeks whilst lowering the BW cutoff to less than 1,251g, 2) lower the GA cutoff to 30+6 weeks whilst keeping a BW of less than 1,501g, or 3) lower both GA and BW cutoff (GA of 30+6 and birth weight of less than 1,251g), 4) use GA only of 31+6 or less, 5) use GA only of 30+6 or less.

With information provided by the Neonatal Data Analysis Unit (NDAU) from the National Neonatal Research Database we examined the effect any changes in screening criteria would have on the number of babies undergoing screening. The data covers the same time period as the national treatment study.

The first option would reduce the number of infants screened by 1,071 babies or 11.1%, the second by 12.6% (1,210 babies), the third by 28.9% (2,790 babies), the fourth by 14.7% (1,414 babies), and the fifth by 35.5% (3,421 babies) (Table 1). Options 1, 2 and 4 would have included all infants requiring treatment in the national treatment study cohort. Option 3 would have missed one infant

who required treatment (GA 31+0 weeks, BW 1,400g) and narrowly included another (GA 30+6 weeks, BW 1,480g), and option 5 would have missed the baby of 31+0 weeks GA.

A previous report from the NDAU has cautioned that reducing the screening criteria to <31 weeks GA or BW<1251g (scenario 3) would over a three-year period from 2009 to 2011 have missed 8 babies requiring treatment. [10]

Based on these figures, it appears safe to tighten the UK ROP screening guidelines to include infants with a GA of 31+6 weeks or less or BW less than 1,251g (scenario 1), or those with GA of 30+6 weeks or BW less than 1,501g (scenario 2). It would not be safe to lower both GA and BW cutoffs (scenario 3). Alternatively, an age only inclusion criteria could be used which, based on our data, would need to be 31+6 or less (scenario 4). The risk of only using GA as an inclusion criteria is that occasionally infants born at over 32 weeks GA may have a very low BW due to growth restriction. However the effect of growth restriction as an independent risk factor for ROP is unknown. Although uncertain GA was an important consideration in an earlier age, in well-developed healthcare systems with good obstetric care and ultrasound dating, this is now an unusual event.

Tightening the guidelines would spare 11 to 14.7% of infants the distress of repeated screening assessments, and reduce the economic burden of screening to the NHS.

We suggest that further prospective research analysing screening and treatment data from both ophthalmology and neonatal sources might allow further refinement in guidelines.

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					Potential reduction in infants screened (%)			
	England	Scotland	Wales	Total	England	Scotland	Wales	Total
Number of infants with BW fulfilling current UK screening guidelines								
GA 31+6 weeks or less OR								
BW less than 1,501g	8767	503	368	9638				
Number of infants to be screened if guidelines tightened								
GA 31+6 weeks or less OR								
BW less than 1,251g	7783	457	327	8567	11.2	9.1	11.1	11.1
GA 30+6 weeks or less OR								
BW less than 1,501g	7683	439	306	8428	12.4	12.7	16.8	12.6
GA 30+6 weeks or less OR								
BW less than 1,251g	6243	360	245	6848	28.8	28.4	33.4	28.9
GA 31+6	7474	439	311	8224	14.7	12.7	15.4	14.7
GA 30+6	5672	333	212	6217	35.3	33.8	42.4	35.5

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113 **Table 1.** Data on infants recorded in the National Neonatal Research Database (birth dates 1
114 December 2013 – 30 November 2014) and potential reduction in infants screened for ROP if UK
115 screening guidelines tightened.

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Members of the UK ROP Special Interest Group:

Abbott, Joseph; Aclimandos, Wagih; Adams, Gill; Al-Khaier, Ayman; Allen, Louise; Arashvan, Kayvan; Ashworth, Jane; Barampouti, Faye; Barnes, Jonathan; Barrett, Victoria; Barry, John Sebastian; Bates, Adam; Berk, Tulin; Biswas, Susmito; Blaikie, Andrew; Brennan, Rosie; Bunting, Howard; Butcher, Jeremy; Butler, Lucilla; Chan-Ling, Tailoi; Chan, Jonathan; Child, Christopher; Choi, Jessy; Clark, David; Clifford, Luke; Dabbagh, Ahmad; Dahlmann-Noor, Annegret; Dawidek, Gervase; Dhir, Luna; Drake, Karen; Edwards, Richard; Esakowitz, Leonard; Escardo-Paton, Julia; Evans, Anthony; Fleck, Brian; Geh, Vernon; George, Nick; Gnanaray, Lawrence; Goyal, Raina; Haigh, Paul; Hancox, Joanne; Haynes, Richard; Heath, Dominic; Henderson, Robert; Hillier, Roxane; Hingorani, Melanie; Jain, Saurabh; Jain, Sunila; Jones, David; Kafil-Hussain, Namir; Kelly, Simon; Kenawy, Nihal; Kipioti, Tina; Kulkarni, Archana; Lavy, Tim; Laws, David; Lawson, Joanna; Leitch, Jane; Ling, Roland; Long, Vernon; Macrae, Mary; Mahmood, Usman; Markham, Richard; Marr, Jane; May, Kristina; McLoone, Eibhlin; Moosa, Murad; Morton, Claire; Mount, Ali; Muen, Wisam; Mulvihill, Alan; Munshi, Vineeta; Muqit, Mahi; Murray, Robert; Nair, Ranjit; Newman, William; O'Colmain, Una; Patel, Chetan; Patel, Himanshu; Pedraza, Luis Amaya; Pilling, Rachel; Puvanachandra, Narman;Quinn, Anthony; Rathod, Dinesh; Reddy, Aravind; Reddy, Ashwin; Rowlands, Alison; Scotcher, Stephen; Scott, Christopher; Sekhri, Rajnish; Shafiq, Ayad; Sleep, Tamsin; Tambe, Katya; Tandon, Anamika; Tappin, Alison; Taylor, Robert; Theodoro, Maria; Thomas, Shery; Thompson, Graham; Tiffin, Peter; Ullah, Muhammed

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